CHAPTER 3

LAND VALUATION METHODS

INDIVIDUAL PARCEL VALUATION

Sales Comparison Analysis. The sales comparison approach, based upon the economic principle of substitution, uses direct evidence of market's opinion of value for the subject property. The approach involves analysis of sales of comparable properties. In addition to actual sales, other sources for sales information for analysis include listings, offers, opinions of real estate agents, and opinions of appraisers. This approach requires obtaining a concise description of the sale properties and a precise expression of the sales price and related information[1]. The description of the sold properties goes beyond just the physical dimensions of the property to include the property rights and restriction to those rights that go with the properties.

The sales comparison approach generally considered the most direct approach in determining market value, uses recent sales with similar property characteristics in the same market area as the subject property. Once the sales have been verified and deemed valid, adjusted for cash equivalencies and stripped of all non-real property assets (see Chapter 2), the sale properties represent the market. The appraiser must now utilize these sales to set market value estimates on both the sold and unsold properties. The process of assigning market value estimates to all the properties requires the appraiser to match the property characteristics of the subject property with recently sold properties that have the most comparable property characteristics. Usually there will be several sales that are comparable to the subject property, requiring the appraiser to select the appropriate value for the subject property from the value range formed by the sale of the comparable properties.

The sales price of an individual property may not reflect the market value of truly comparable properties. If the subject property's sales price appears at either end of the market value range, the value placed on it for property tax purposes must reflect the composite of all comparables. Primarily due to the differing motivation of the buyers and the sellers and the adjustments required for cash equivalency, the value derived from the sales comparison approach covers a range of values and not just a fixed-point value. A strong seller will hold the price up while a strong buyer will drive the price down. Given the mix of buyers and sellers, the sales price on very similar properties could vary considerably.

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[1] For property tax purposes, the property should be valued free of any encumbrance as if in its “fee simple state”.

Two factors limit the usefulness of this method of valuation. First, not all sales give a good indication of market value. The appraiser must investigate and analyze the conditions surrounding each sale to determine validity. Second, certain types of property sold infrequently results in the lack of close substitutes and in insufficient market evidence. In a market with a lack of comparable sales, the appraiser attempting to use the market comparison method must make many adjustments. In spite of these limitations, adjusting actual valid sales to the subject usually replicates a more accurate index of market value than any alternative available. With the availability of reliable data, appraisers prefer the sales comparison method when valuing land.

With insufficient land sales, the appraiser has the option to utilize the allocation or land ratio method, the abstraction method, the anticipated use or cost of development method, the capitalization of ground rents method, or the land residual capitalization method. Successful application of these less preferred methods of land valuation rests in the ability of the appraiser to conduct careful research and exercise good judgement. Listed in order of preference, the following land valuation methods use the sales comparison approach and the income approach for the individual parcel valuation of commercial, industrial, agricultural, and residential land. With enough available land sales, the appraiser has the choice to implement the comparative unit method or the base lot method, which has primary applications of the sales comparison approach.

1. **Comparative Unit Method.** A method of appraising land parcels based on an estimated average or typical value for each stratum of land. The calculated median or mean land sales price per unit represents the average or typical land value. All values chosen for each stratum requires analysis from market data. The appraiser must consider the reasonableness and consistency of choices for each stratum. Market data plotted on maps and driving around the appraisal area gives visual confirmation to the value choices in each stratum. This process verifies relative desirability of each stratum. Block to block analysis will reveal sales trends based on differences in proximity to parks and schools, traffic patterns, noise levels, housing styles and overall block attractiveness. After the establishment of comparative unit values, refinement to the individual parcel level by developing unit values for each block face will address most variations in land values within the area.

a) **Front foot.** Use front foot when front footage significantly contributes to value. Buyers usually purchase prime waterfront lots and prime commercial lots by front foot.

b) **Square foot.** Use square foot as a unit of comparison when the analysis indicates that sites typically sell for a given price per square foot of land area.

c) **Acre.** In general, market analysis will show that appraisers should use price per acre as the unit of comparison for large industrial sites rural and agricultural properties. Convert land area to acres by dividing square footage of land by 43,560 square feet per acre.

d) **Site.** Use site value as a unit of comparison when the market does not indicate a difference in value due to land size. Typically, appraisers use site value as a unit of comparison for valuing residential subdivisions, planned unit developments and industrial parks.

e) **Units buildable.** When a parcel of land sells on a unit capacity basis, an appraiser will use units buildable as a unit of comparison. Apartment property sold by buildable apartment unit in a subarea area justifies the use of units buildable as the unit of comparison for apartment land.

Example. An appraiser must analyze land sales data and select the best unit of comparison.

Land Sale	Price	Price/Lot	Front Foot	Price/FF	Sq. Ft.	Price/Sq. Ft.
1	68,000	68,000	100	680	7,500	9.07
2	36,000	36,000	50	720	4,500	8.00
3	35,500	35,500	50	710	5,500	6.45
4	50,000	50,000	75	667	5,625	8.89
5	69,500	69,500	100	695	9,000	7.72
6	51,000	51,000	75	680	5,625	9.07
7	35,000	35,000	50	700	5,500	6.36
8	70,000	70,000	100	700	9,000	7.78
9	69,500	69,500	100	695	7,500	9.27
10	52,500	52,500	75	700	5,625	9.33

Unit of Comparison	Range	Percent Difference
Price / Lot	$35,000 to $69,500	49.64
Price / Front Foot	$667 to $720	7.36
Price / Square Foot	$6.36 to $9.07	28.88

In the example above the data indicates that price per front foot has the least percent difference, and the use of price per front foot will reduce variation in value when applied to subject properties. Divide the difference of the upper and lower limits by the upper limit to calculate percent difference.

f) **Advantages.** Advantages of the comparative unit method include ease of use, simplicity, and efficiency. When the subarea varies in size, but has all other land characteristics in common, the comparative unit method has the advantage over the base lot method. The comparative unit method requires refining by block and individual lot the same as the base lot method.

2. **Base Lot Method.** This method uses the sales comparison approach to estimate the value of the base lot. The appraiser selects the most typical lot in the subarea as the base lot.

a) **Standard of comparison.** The base lot provides a standard of comparison to value the remainder of the parcels in the subarea by making adjustments for differences in property characteristics between the base lot and the subject parcel. The base lot method calculates adjustment amounts caused by differences in property characteristics between the base lot and other comparable sales. The application of these adjustment amounts to the base lot value for differences in property characteristics of individual subject parcels gives an estimate of value for all the parcels in the subarea.

b) **Benchmarks.** The base lot method establishes land sale properties as benchmarks for properties different from the base lot. Size, view, location, shape, topography and access make up the most typical adjustments to land. Always develop the most supportable adjustment first, the next most supportable second,

and so forth. One common method of market analysis to develop adjustment amounts involves the use of matched pairs. Matched pair analysis requires similarity of sales in all but one characteristic. For example two similar lots in the same neighborhood sell, one with a view and one without a view. Since one sale does not make a market, it requires a succession of these matched pairs to validate a view adjustment. An extension of the matched pair concept compares a sales grid to the base lot. For example, ten sales differ from the base lot in only one property characteristic. Two sales differ due to location, three sales differ due to street type, and five sales differ due to view. Remember, always determine the most supportable adjustment first. In this case, first calculate the view adjustment, then the street type adjustment, and finally the location adjustment.

Example. An appraiser must analyze sales data and select a base lot value.

	Time-adjusted sale price (in dollars)	**View**	**Traffic**	**Size**	**Adjusted sale price (in dollars)**
Base lot	N/A	Standard	Moderate	¼ acre	N/A
Comparable 1	53,000	Standard	Light	¼ acre	50,350
			(-.05)		(-.05)
Comparable 2	53,000	Standard	Moderate	¼ acre	53,000
Comparable 3	79,400	Premium	Light	¼ acre	55,580
		(-.25)	(-.05)		(-.30)
Comparable 4	47,000	Restricted	Moderate	¼ acre	54,050
		(+.15)			(+.15)
Comparable 5	64,000	Standard	Moderate	½ acre	44,800
				(-.30)	(-.30)
Comparable 6	45,000	Restricted	Heavy	¼ acre	56,250
		(+.15)	(+.10)		(+.25)

Comparable 2 reflects the base lot value at $53,000. Measures of dispersion gauge the accuracy of base lot values. Large measures of dispersion indicate a need for additional analysis. In the example above the values range from a low of $44,800 to a high of $56,250, and the average absolute deviation from the base lot value equaling $2,955, or about 5.6 percent of $53,000, indicates consistency among comparables. If the appraiser encounters large measures of dispersion, further stratification generating additional base lots will reduce average absolute deviation.

c) **Advantages.** Advantages to the base lot method include accurate and supportable benchmarks that aid in the defense of values. Also, the base lot method has a high degree of explicability to the taxpayer. When an appraiser needs to adjust for many differences in property characteristics, the base lot method exhibits superiority over the comparative unit method. For additional explanation about the comparative unit method or the base lot method see Chapter Seven in Property Appraisal and Assessment Administration[2].

3. **Allocation Method.** The allocation method has basis in the theory that for a given type of property and area, the appraiser can determine a consistent overall relationship between land and improvement values. The allocation method includes estimating the amount of value that land contributes to the total value by appraiser's knowledge, by previous year's land values, by analysis of new construction sites from similar market areas, and by land to building ratios from similar market areas. Appraisers analyze vacant land sales and improved sales from comparable and competing market areas to develop appropriate land to building ratios. In the absence of sufficient land sales, applications of the ratio in the subject market area to improved sales will give reasonably accurate land values. Land values estimated by the allocation method require additional analyzing to establish comparative unit values or base lot values. Converting land estimates to comparative unit values or base lot values will enhance uniformity and consistency among parcels in the subject market area.

[2] Copyright © 1990 by the International Association of Assessing Officers.

Example. Recently developed land and improvement values derived from market land sales for three comparable neighborhoods indicate the following land ratios.

Neighborhood	Average land value	Average total value	Land ratio
1	29,672	117,067	0.253
2	33,632	127,243	0.264
3	32,261	120,330	0.268

If a typical property in the subject area recently sold for $123,000, we estimate the land value as 26% of the sale price, or $31,980. This process applied to improved sale properties in the subject area obtains a set of estimated benchmark values. These estimated benchmark values comprise the basis for comparative unit values and base lot values.

a) **Advantages and Disadvantages.** The allocation method does not have the specific requirement for estimated improvement values as does the abstraction method, which makes the allocation method particularly appropriate to value older neighborhoods with few sales of vacant or newly improved parcels.

4. **Abstraction Method.** The abstraction method subtracts the depreciated replacement cost of improvement value from the sales price to yield the residual land value estimate. These calculated land values supplement the land sales database. The reliability of the generated improvement values depends on the accuracy of the cost model and the judgement of the appraiser in the calculation of depreciation. Sales with newer improvements make it easier to estimate depreciation, which gives a better residual land value estimate. As a last resort, if the market area does not have enough improved sales, the appraiser may use appraised values instead of improved sales. The appraiser should carefully validate the appraised values before implementing this diluted form of the abstraction method. Land residual estimates generated by the abstraction method require further analyzing to establish comparative unit values or base lot values. Converting land residual estimates to comparative unit values or base lot values will enhance uniformity and consistency among parcels in the market area.

Example. Demonstrates the abstraction method of land valuation.

Sale price of property		$ 180,000
Replacement cost new estimate	$ 200,000	
Less accrued depreciation	$ 50,000	
Estimated value of improvements		$ 150,000
Indicated land value		$ 30,000

a) **Advantages and Disadvantages.** In developed areas with few or no land sales, the abstraction method provides an alternative land valuation method. This method of land valuation weakly substitutes for the direct sales comparison method, but will suffice in the absence of vacant land sales.

5. **Anticipated Use or Cost of Development Method.** In the absence of sufficient land sales data, the appraiser hypothetically develops the vacant site. This method involves some speculation, and the projected improvements must represent the most probable use of the land. The results of this method, based in the principle of surplus productivity, indicates the price a prudent developer will pay for land in its present undeveloped condition by subtracting the total development costs from the projected sales prices of the lots as if developed. The appraiser calculates the residual land value after the satisfaction of labor, capital, and management.

Example. A study of the market with necessary technical assistance shows the distribution of costs for site development at 25 percent, overhead and sales expense at 25 percent, and profit and interest at 25 percent.

Projected sale price of tract (36,000 X 100 lots)		$3,600,000
Site development: streets, sewers, water service, site preparation, planning	$ 900,000	
Overhead and sales expense	$ 900,000	
Profit, interest, and entrepreneurial profit	$ 900,000	
Less estimated total development costs		$2,700,000
Indicated value of undeveloped land		$ 900,000

a) **Advantages and Disadvantages.** The anticipated use or cost of development method serves as a backup method to substantiate the direct sales comparison method. The cost of development method falls under criticism primarily because of its hypothetical nature. Appraisers must not arbitrarily select percentage of projected sale price as the indicated value of the raw land. In order to defend the land values generated from this method, the appraiser must perform a study of the market, and solicit the necessary technical assistance to develop a reliable percentage of projected sale price. This method serves as a substitute only when the subject market area lacks sufficient land sales to employ the direct sales comparison method.

Income Approach Analysis. Income property as a class is "that property which for its primary purpose has the capacity to produce monetary income." All income properties have one common appraisal characteristics: their value has basis in the quantity, quality, and durability of their estimated net income stream before debt service and after allowable expenses are deducted. The capitalization of the income stream generated by land gives an important indication of value.

The five commonly accepted ways an income property owner realizes a return on an investment include:

a) monthly incomes representing a difference between gross cash flow and expenses,

b) income tax benefits derived from applying interest payments,

c) taxes and building depreciation against income,

d) amortization derived from using the cash flow to make the mortgage payments, and

e) appreciation of property based on economic trends or upgrading.

6. **Capitalization of Land Rent.** The performance of land valuation through direct capitalization of land rent requires land rented or leased independently of improvements. The method has its greatest application in the appraisal of farmland. In compliance with the A.R.S. § 42- 13101, Arizona uses this method exclusively to value agricultural land.

The Agricultural Manual, published by the Department of Revenue, discusses the statutory valuation of agricultural land.

In addition, this capitalization of land rent has application for commercial land with leases on a net basis. Appraisers evaluate leases to assure consistency of terms of the lease with current market requirements. Net rent from a lease of commercial land can be directly capitalized into an indication of land value.

Example. Assume a piece of downtown land used for parking recently leased on a net basis for ten years at a rate of $18,000 per year. Capitalized at the appropriate market rate of 10 percent, see the indicated market value below:

$18,000 / 0.10 = $180,000

7. **Land Residual Capitalization.** Apply the land residual capitalization technique with a known improvement value coupled with the absence of vacant land sales to support the land value. The relatively new improvements must represent the highest and best use of the land, and have no observed depreciation to accurately estimate the their value. The land residual technique uses straight line, annuity, or sinking fund income capitalization methods. Information necessary to process a land residual technique problem includes (1) the net operating income, (2) the building value, (3) the proper discount rate, (4) the proper recapture rate, and (5) the effective tax rate.

Example 1. Capitalization using the straight-line recapture method with the land residual technique.

Assumptions:

Building value	$240,000
Remaining economic life	40 years
Discount rate	0.10
Annual gross rental income	$ 50,000
Annual operating expenses	$ 10,000

Calculations:

Gross annual income	$ 50,000
Less annual operating expenses	10,000
Net annual income	$ 40,000
Building value	$240,000
Times capitalization rate (0.10 discount rate+ 0.025 recapture + 0.025 effective tax rate)	0.15
Income attributable to the building	$ 36,000
Net annual income	$ 40,000
Less income attributable to building	36,000
Income attributable to the land	$ 4,000

To calculate land value, divide income attributable to the land by the discount rate of 0.10 plus the effective tax rate of 0.025. There is no recapture increment in the land capitalization rate.

	Building	$240,000
$4,000 / 0.125= $32,000	Land	32,000
	Total	$272,000

Example 2. A two-year-old office property has a net operating income (NOI) of $200,000 per year. The building is valued at $1,200,000 and has an estimated 40-year remaining economic life. The current discount rate is 10%, current effective tax rate is 2% and the recapture rate is (1 / REL of 40 years = 0.025 or 2.5%).

Net income before recapture and real estate taxes		$200,000
Capitalization Rate:		
Discount Rate	10%	
Recapture Rate	2.5%	
Effective Tax Rate	2%	
	14.5%	
Less income from building (0.145 x 1,200,000)		$174,000
Income attributable to land		$ 26,000
Land Value $26,000 / 0.12 (Discount Rate + ETR)		$216,666

Example 3. Land Residual Method (Annuity Capitalization) with same assumptions as stated in example 2.

Net income before recapture and real estate taxes	$200,000
Partial payment factor[3] 10% for 40 years	0.1023
Effective tax rate	0.0200
Total	0.1223
Less income from building (0.1223 x 1,200,000)	$146,760
Income attributable to land	$ 53,240
Land Value[4] $53,240 / 0.12 (Discount Rate + ETR)	$443,666

[3] The appendix in Property Assessment Valuation, 2nd Edition, contains compound interest tables used to calculate land value by the income approach.

[4] For further assistance see Chapter 12 of Property Appraisal and Assessment Administration, and Chapter 5 of Property Assessment Valuation, 2nd Edition, both published by the International Association of Assessing Officers.